United States
Environmental Protection
Agency

Pollution Prevention
and Toxics
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OPPT Chemical Fact Sheets

Acrylonitrile Fact Sheet (CAS No. 107-13-1)

Chemicals can be released to the environment as a result of their manufacture, processing, and use. EPA has developed information summaries on selected chemicals to describe how you might be exposed to these chemicals, how exposure to them might affect you and the environment, what happens to them in the environment, who regulates them, and whom to contact for additional information. EPA is committed to reducing environmental releases of chemicals through source reduction and other practices that reduce creation of pollutants.

WHAT IS ACRYLONITRILE, HOW IS IT USED, AND HOW MIGHT I BE EXPOSED?

Acrylonitrile (also called AN and vinyl cyanide) is a colorless, flammable liquid. Its vapors may explode when exposed to an open flame. AN does not occur naturally. It is produced in very large amounts (2.5 billion pounds in 1993) by five companies in the United States. U.S. demand is likely to increase 2 to 3 percent per year for the next several years. The largest users of acrylonitrile are companies that make acrylic and modacrylic fibers. Companies also use AN to make:

- high impact acrylonitrile-butadiene-styrene (ABS) plastics used in business machines, luggage, and construction material;
- styrene-acrylonitrile (SAN) plastics used in automotive and household goods and in packaging material;
- adiponitrile, a chemical used to make nylon; and
- dyes, drugs, and pesticides.

Exposure to acrylonitrile can occur in the workplace or in the environment following releases to air, water, land, or groundwater. Exposure can also occur when people smoke cigarettes or breathe automobile exhaust. Acrylonitrile enters the body when people breathe air or consume water or food contaminated with AN. It can also be absorbed through skin contact. It does not remain in the body due to its breakdown and removal.

WHAT HAPPENS TO ACRYLONITRILE IN THE ENVIRONMENT?

Acrylonitrile evaporates when exposed to air. It dissolves when mixed with water. Most releases of acrylonitrile to the environment are to underground sites or to air. Acrylonitrile evaporates from water and soil exposed to air. Once in air, AN breaks down to other chemicals. Microorganisms living in water and in soil can also break down AN. Because it is a liquid that does not bind well to soil, acrylonitrile that makes its way into the ground can move through the ground and enter groundwater. Plants and animals are not likely to store acrylonitrile.

HOW DOES ACRYLONITRILE AFFECT HUMAN HEALTH AND THE ENVIRONMENT?

Effects of acrylonitrile on human health and the environment depend on how much acrylonitrile is present and the length and frequency of exposure. Effects also depend on the health of a person or the condition of the environment when exposure occurs.

Breathing acrylonitrile for short periods of time adversely affects the nervous system, the blood, the kidneys, and the liver. These effects subside when exposure stops. Nervous system effects of AN range from headaches and dizziness to irritability, rapid heart beat, and death. Symptoms of acrylonitrile poisoning may occur quickly after exposure or after levels of breakdown products like cyanide build up in the body. Direct contact with acrylonitrile liquid severely damages the skin. Acrylonitrile liquid or vapor irritates the eyes, the nose, and the throat. These effects are not likely to occur at levels of acrylonitrile that are normally found in the environment.

There are several health effects case studies of acrylonitrile workers. The methods used in these studies limit conclusions that can be made from the results. These studies show that workers repeatedly breathing small amounts of acrylonitrile over long periods of time may develop cancer. Cancer occurs primarily in the respiratory tract. Laboratory studies show that repeated exposure to acrylonitrile in air or in drinking water over a lifetime also causes cancer in animals. Studies also show that repeated exposure to acrylonitrile adversely affects the respiratory and central nervous systems and causes developmental toxicity in laboratory animals.

Acrylonitrile has moderate toxicity to aquatic life. By itself it is not likely to cause environmental harm at levels normally found in the environment. Acrylonitrile can contribute to the formation of photochemical smog when it reacts with other volatile substances in air.

WHAT EPA OFFICES OR OTHER FEDERAL AGENCIES OR OTHER GROUPS CAN I CONTACT FOR ADDITIONAL INFORMATION ON ACRYLONITRILE?

EPA OFFICE	LAW	PHONE NUMBER
Pollution Prevention & Toxics	Emergency Planning and Community Right-to-Know Act (EPCRA) (§ 313/ Toxics Release Inventory data)	(202) 260-1531
	Toxic Substances Control Act (TSCA)	(202) 554-1404
Air	Clean Air Act	(919) 541-0888
Solid Waste & Emergency Response	Resource Conservation and Recovery Act (RCRA) Comprehensive Environmental Response, Compensation, and Liability Act (Superfund) EPCRA (§302)	(800) 535-0202
Water	Clean Water Act	(202) 260-7588
	Safe Drinking Water Act	(800) 426-4791

For general information on reducing or eliminating industrial pollutants through technology transfer, education, and public awareness, contact the Pollution Prevention Information Clearinghouse, (202) 260-1023.

OTHER FEDERAL AGENCY/DEPARTMENT OR GROUP	PHONE NUMBER
American Conference of Governmental Industrial Hygienists	(513) 742-2020
Consumer Product Safety Commission	(301) 504-0994
Food and Drug Administration	(301) 443-3170
National Institute for Occupational Safety & Health	(800) 356-4674
National Institute of Environmental Health Sciences (EnviroHealth Clearinghouse)	(800) 643-4794
Occupational Safety & Health Administration *(Check local phone book for phone number under Department of Labor)*	

The Support Document for this and other OPPT Chemical Fact Sheets can be found on the Internet at:
http://www.epa.gov/chemfact